On the basis of this similarity measurement, a number of "candidates" belonging to a search zone and having a high degree of resemblance to the initial microcalcification are selected in order to obtain the homologous region of interest.

Next, by using the principles of stereotaxy, the three-dimensional coordinates of these candidates are calculated, then they are reprojected onto the centering image. The similarity between these reprojected points and the microcalcification initially chosen is again calculated. In fact, if the candidate actually corresponds to the initial microcalcification, then its calculated projection will actually correspond to the image of this microcalcification on the centering image.

Finally, with the aid of these two similarity values calculated for each candidate, the best candidate is proposed.

In theory, it would be possible to omit the step of reprojection using the centering image and to make do with the matching as has just been explained in order to select the region of interest homologous to the one selected on the target image. However, it is by far preferable to use the reprojection of the candidates onto the centering image in order to verify the first selection made, in particular in the field of mammography in which the microcalcifications may change shape and contrast from one image to another.

In other words, a method for locating an element of interest contained in a three-dimensional object on the basis of the positions of homologous regions of interest corresponding to the said element of interest and appearing in a set of stereotaxic images of the said object. This method includes a step of selecting, in a first stereotaxic image, or target image, a first region of interest, in particular a

microcalcification, referred to as the target region of interest. The method also includes a matching of the said first region with a second region of interest, homologous to the first and appearing in a second stereotaxic image.

According to a general characteristic of the invention, the stereotaxic images being digitized, a target pixel in the said target region of interest is selected in the selection step. In the matching step, a target window of chosen dimensional characteristics and containing the said target region of interest is generated around the selected target pixel. A set of pixels is then determined in the second image, according to a predetermined selection criterion, and a second window, of the same dimensional characteristics as the said target window, is generated around each selected pixel. A correlation processing is carried out between the grey-scale levels of the pixels in each second window and the grey-scale levels of the pixels in the target window, so as to obtain a correlation value for each second window. The region of interest homologous to the target region of interest is then identified on the basis of the analysis of the set of correlation values thus obtained. The risks of matching error between homologous regions of interest are thus minimized.

According to one embodiment, the analysis of the correlation values obtained includes the selection of a certain number of correlation maxima or minima, the homologous region being selected from those whose associated correlation value is one of these correlation maxima or minima.

In fact, depending on whether the image is "normal" or inverted (a "normal" image being defined as having grey-scale levels and contrasts

On the basis of this similarity measurement, a number of "candidates" belonging to a search zone and having a high degree of resemblance to the initial microcalcification are selected in order to obtain the homologous region of interest.

Next, by using the principles of stereotaxy, the three-dimensional coordinates of these candidates are calculated, then they are reprojected onto the centering image. The similarity between these reprojected points and the microcalcification initially chosen is again calculated. In fact, if the candidate actually corresponds to the initial microcalcification, then its calculated projection will actually correspond to the image of this microcalcification on the centering image.

Finally, with the aid of these two similarity values calculated for each candidate, the best candidate is proposed.

In theory, it would be possible to omit the step of reprojection using the centering image and to make do with the matching as has just been explained in order to select the region of interest homologous to the one selected on the target image. However, it is by far preferable to use the reprojection of the candidates onto the centering image in order to verify the first selection made, in particular in the field of mammography in which the microcalcifications may change shape and contrast from one image to another.

In other words, [the invention is proposes] a method for locating an element of interest contained in a three-dimensional object on the basis of the positions of homologous regions of interest corresponding to the said element of interest and appearing in a set of stereotaxic images of the said object. This method includes a step of selecting, in a first stereotaxic image, or target image, a first region of interest, in particular a

microcalcification, referred to as the target region of interest. The method also includes a matching of the said first region with a second region of interest, homologous to the first and appearing in a second stereotaxic image.

According to a general characteristic of the invention, the stereotaxic images being digitized, a target pixel in the said target region of interest is selected in the selection step. In the matching step, a target window of chosen dimensional characteristics and containing the said target region of interest is generated around the selected target pixel. A set of pixels is then determined in the second image, according to a predetermined selection criterion,[,] and a second window, of the same dimensional characteristics as the said target window, is generated around each selected pixel. A correlation processing is carried out between the grey-scale levels of the pixels in each second window and the grey-scale levels of the pixels in the target window, so as to obtain a correlation value for each second window. The region of interest homologous to the target region of interest is then identified on the basis of the analysis of the set of correlation values thus obtained. The risks of matching error between homologous regions of interest are thus minimized.

According to one embodiment, the analysis of the correlation values obtained includes the selection of a certain number of correlation maxima or minima, the homologous region being selected from those whose associated correlation value is one of these correlation maxima or minima.

In fact, depending on whether the image is "normal" or inverted (a "normal" image being defined as having grey-scale levels and contrasts